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The Polyp and Medusa of the Hydrozoan, *Stauridiosarsia japonica* n. sp., from Akkeshi, Hokkaido[1)]

With 5 Text-figures

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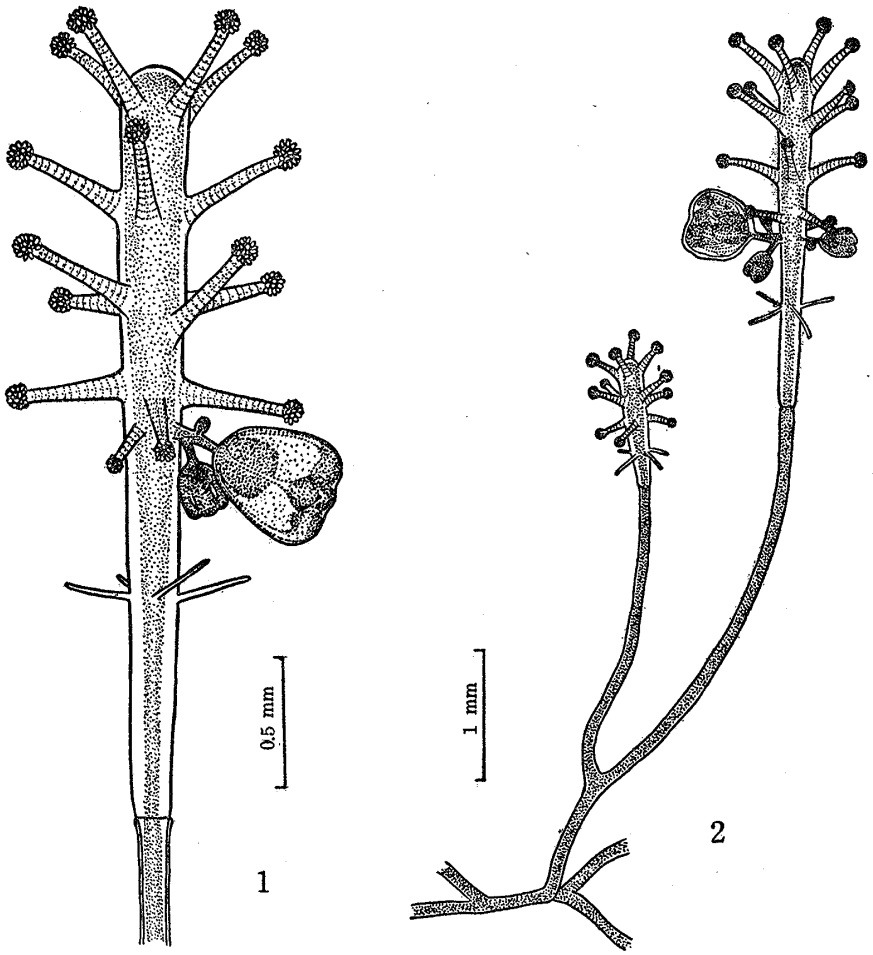
(*Communicated by* T. UCHIDA)

During the past two years the writer has frequently found near the Akkeshi Marine Biological Station several hydroids of *Stauridiosarsia*-type, growing on the dead shell surface of a gastropod *Fusitriton oregonensis* (Redfield) obtained by dredging from 3–4 m depth. Some of these colonies reared in the laboratory began to liberate medusae on June 17, 1961. During the month the water temperature gradually increased from 9°C to 15°C. The sea water was changed daily. Polyps and medusae were fed mainly with *Artemia salina* larvae. The developmental change of the medusae differs from that of *Stauridiosarsia producta* (Wright) in several features, thence formation is justifiable of a new species, *Stauridiosarsia japonica* n. sp. as described below.

The polyp (Figs. 1, 2): The colonies grow on the shell surface of dead *Fusitriton oregonensis* which is occasionally inhabited by a hermit-crab, *Pagurus pectinatus*. Polyps attaining 6.5 mm in height arise from a creeping stolon which is often embedded in debris covering the shell surface. The creeping branched hydrorhiza is covered by a thin transparent sheath which continues to the hydrocaulus. In the culture dish, the hydrorhiza initially grows in simple directions giving rise to several stolons, and afterwards comes to form a complicated network without anastomosing. The hydrocaulus springing from the creeping stolon is simple or often once or twice irregularly branched (Fig. 2) It is of slender tubular shape covered with a thin transparent perisarc which is smooth in surface, without distinct annulation, about 0.1 mm in width. In old specimens the perisarc which surrounds both the stolon and the hydrocaulus often is slightly horn-colored. The hydranth (Fig. 1) is club-shaped in form, tapering toward the base, attains 2.3–2.8 mm in length, about 0.25 mm in width in extended living specimens. It is pale orange in color. The hypostome

1) Contributions from the Akkeshi Marine Biological Station, No. 118.



Figs. 1, 2. *Stauridiosarsia japonica* n. sp. The polyp. 1. A hydranth with three medusa buds. 2. A branched old polyp with five medusa buds.

is of blunt conical shape with a terminal mouth. On the distal half of the hydranth, there are 12–19 capitate tentacles in three to four alternating whorls of four or five tentacles. The tentacles of the lowest whorl are often rather irregularly arranged in respect to both position and number. Below the capitate tentacle whorls there is a whorl of four or five reduced filiform tentacles at about two-thirds of the proximal part of the hydranth. Under good conditions these reduced filiform tentacles show active development, but they often become reduced in length and retarded in features under unsuitable conditions or in declining stage of polyp. In young polyps newly developed from the stolon the filiform tentacles appear early at the stage, provided with one or two terminal capitate tentacle whorls.

The medusa buds are born on rather long peduncles arising at about the same level as the lowest capitate tentacle whorl which is often provided with fewer tentacles than those of the upper whorls. The peduncle bears frequently one or two lateral branches with medusa buds of various developmental stages.

On a hydranth there are usually three to five, up to seven medusa buds simultaneously. About two weeks after the appearance of the medusa buds, the young medusae are set free from the polyps.

Nematocysts of the polyp are of only one kind, stenoteles, which are of two different sizes. Large stenoteles measure $25.3 \times 17.2\,\mu$ (undischarged) and $19.6 \times 13.9\,\mu$ (discharged), small ones $13.8 \times 9.2\,\mu$ (undischarged) and $10.8 \times 6.9\,\mu$ (discharged). These figures are the means of 20 measurements; the range of variation is very narrow. The small stenoteles are found more abundantly than the large ones.

The medusa (Figs. 3–5): About three weeks after liberation from the mother polyp the medusae come to assume the adult form (Fig. 3). At that time, the umbrella is of bell shape, slightly higher than broad, 2.5–3.15 mm high, 2.25–2.75 mm in width. The vellum is well developed. In the medusa before about 30 days old, the exumbrellar nematocysts remain concentrated at eight adradial zones, but they become gradually obscure along with the medusan development, and entirely disappear about 30 days after liberation. The manubrium is cylindrical in form, rather short, about two-thirds the subumbrellar height in extension, the proximal end of it being rather narrow. The central part of the manubrium is slightly swollen out, and yellowish green in color. The mouth is simple, tube-like in form. A small apical knob is present. The four narrow radial canals arise from the apex of the stomach. The ring canal is narrower than the radial canals. The marginal tentacle bulb is moderate in size and orange color in central part. On the abaxial side of the bulb, there is present a reddish black ocellus. Four marginal tentacles are long, reaching about three times the bell height in full extension; there are many nematocyst clusters on their shafts but no distinct ring, terminating a small nematocyst knob. The gonad develops around the stomach, mostly at the middle region. In early stages of female development the gonad appears as a milky white mass; when it becomes fully mature many rather large ova are clearly recognizable through the ovarian wall. All specimens reared were females.

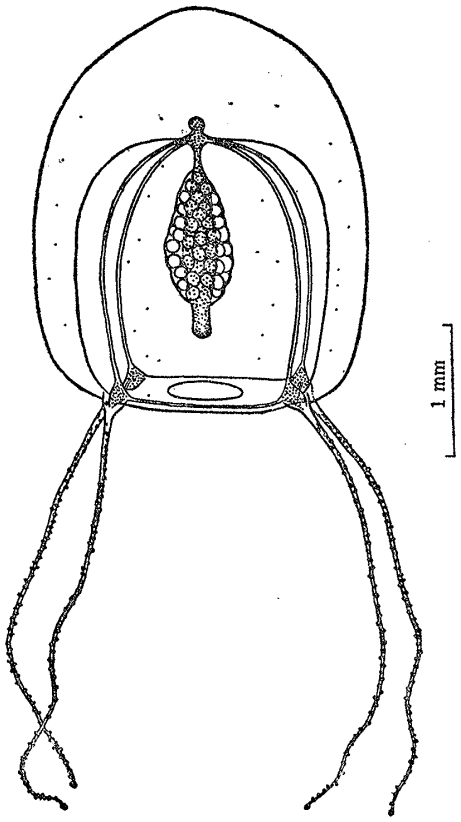
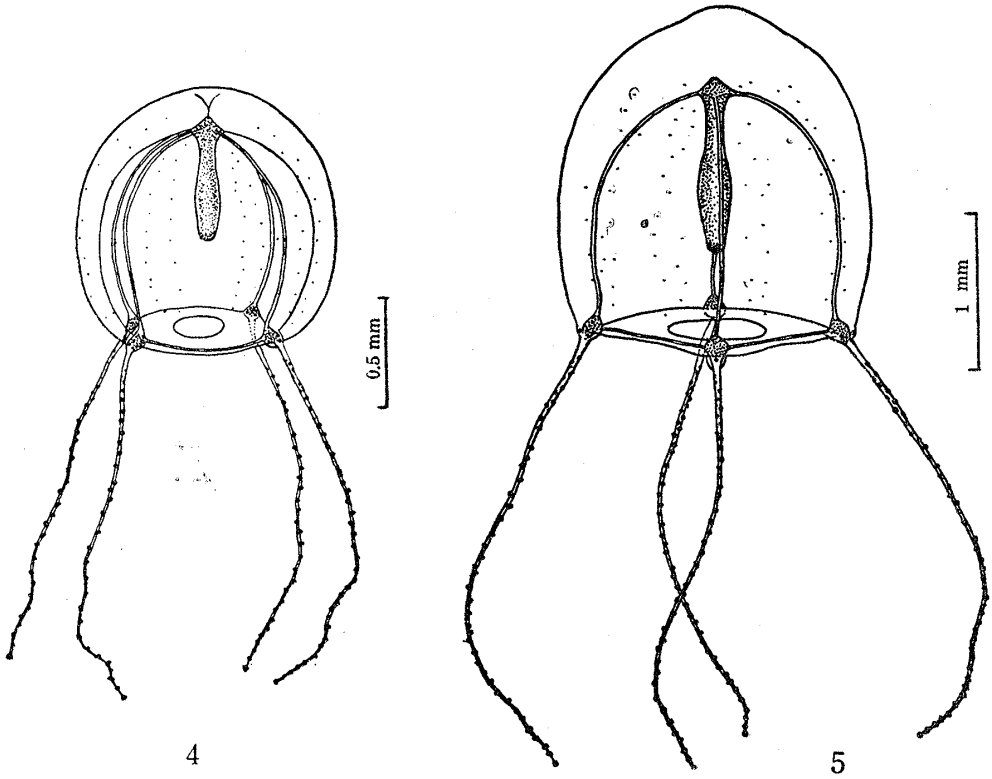


Fig. 3. *Stauridiosarsia japonica* n. sp. Adult medusa.

Nematocysts of the rather young medusae are of three kinds, stenoteles, desmonemes, and microbasic mastigophores. Stenoteles measure $13.3 \times 8.9\,\mu$ (undischarged) and $10.0 \times 7.5\,\mu$ (discharged), desmonemes $10.7 \times 5.2\,\mu$ (undischarged), and $8.8 \times 4.0\,\mu$ (discharged), microbasic mastigophores $14.1 \times 11.1\,\mu$ (undischarged) and $12.9 \times 9.9\,\mu$ (discharged). The figures are the means of 20 measurements; the range of variation is very narrow.

Developmental change of the medusa. The newly liberated medusa (Fig. 4) has a nearly spherical umbrella, 1.1–1.35 mm in height, 1.1–1.4 mm in width. On the exumbrella there are many nematocysts. They show a characteristic feature in their distribution forming one or two irregular rows along the eight adradial zones. The jelly is of moderate thickness. The vellum is well developed. The manubrium is tubular in form, about half the length of the subumbrellar height in full extension, and yellowish gray in color. The apical end of the manubrium shows a blunt conical form connected with the exumbrellar apex for a time. The marginal tentacle bulb is moderate in size, pale orange in color; on the abaxial side of it a small ocellus is already clearly recognizable. On the whole shaft of the marginal tentacle there are 20–30 nematocyst clusters irregularly distributed, forming no distinct ring.



Figs. 4-5. *Stauridiosarsia japonica* n. sp. Young medusae. 4. Newly liberated young medusa. 5. Medusa, nine days after liberation.

One or two days afterwards medusae become 1.3–1.6 mm in height, 1.4–1.65 mm in width. Now the exumbrellar apex becomes free from the apex of the stomach and the umbrella assumes a bell-shape. In 3–5 days old medusae, 1.6–1.85 mm high, 1.55–1.75 mm wide, the umbrella becomes rather higher than broad; central part of the stomach becomes somewhat swollen out, tinted slightly yellowish green. In medusae, 7–9 days old (Fig. 5), 1.8–2.25 mm in height, 1.75–

2.15 mm in width, the umbrellar apex has a tendency to assume a slight apical projection, and the apical knob is clearly recognizable. On account of increase in umbrellar size the density of the exumbrellar nematocysts becomes decreased, but their characteristic distribution is still retained. In medusae, about 12 days old, measuring up to 2.3 mm high, 2.1 mm wide, the gonad begins to develop around the stomach. At the early stage of gonadal development a milky white mass is found around the stomach. Two to three days after, many rather large ova become recognizable through the ovarian wall. After spawning, the ovary shows again as a milky white mass in appearance. It is supposedly probable that maturation and spawning are repeated more than two times during the life of the medusa. In medusae, 30 days or more old, the characteristic exumbrellar nematocysts completely disappear, and the umbrellar apex which was rather projected changes into blunt bell-shape. Medusae, 40–50 days old, attain 3.0–4.0 mm in height, 3.0–3.65 mm in width. The oldest medusae reared were 53 days old on August

Table 1

Features distinguishing *St. japonica* n. sp. from *St. producta* (Wright)

Species		*St. japonica* n. sp.	*St. producta* (Wright)	Authors
Polyp	hydrocaulus	longer than hydranth	shorter than hydranth	Hincks, 1868 Allman, 1872 Hartlaub, 1895 Rees, 1938
	medusa buds located on	the lowest capitate tentacle region	the base of the lower capitate tentacles or in position of the tentacles of the third whorl	Hincks, 1868 Mayer, 1910 Hartlaub, 1895
	peduncle of medusa bud	usually 2-3 branched	simple	Hincks, 1868 Hartlaub, 1895
Medusa	height of umbrella	up to 4 mm	up to 10 mm	Hartlaub, 1895 〃 1917 Kramp, 1961
	exumbrellar nematocysts	in eight adradial zones, remain about 4 weeks	irregularly scattered, disappear after a week	Hartlaub, 1895 Russell, 1953
	length of manubrium	not beyond the umbrella margin	1/3 beyond the umbrella margin	Hartlaub, 1895 Mayer, 1910 Russell, 1953
	gonad	rather central part of the stomach	whole region of the stomach	Hartlaub, 1895 Mayer, 1910 Russell, 1953
	marginal tentacle bulb	of moderate size	well-developed	Mayer, 1910 Russell, 1953

12, 1961. No asexual reproduction was observed at any time in the life of the medusae.

Remarks. There is known only one species, *St. producta* (Wright) in the genus *Stauridiosarsia*. The medusa has been reported from British coasts, Helgoland, Valencia, Santos, and others (Mayer, 1910; Russell, 1953; Kramp, 1961; and others). Concerning the structure and the developmental process of *St. producta*, Hartlaub (1895) described the polyp and the medusa from Helgoland's specimens. It is known that there were found in the species two different forms, one in specimens from England and the other in those of Helgoland (Hincks, 1868; Hartlaub, 1895). Comparing these two forms of *St. producta* with the Japanese species, the latter shows rather close resemblance to the England form, but there are several differences between the two species as shown in Table 1. One of the most characteristic features of the new species lies in the presence of eight adradial exumbrellar nematocysts in the new species. In *St. producta* nematocysts are irregularly scattered on the exumbrella.

On the other hand, the medusa of the species resembles the following four species belonging to the genus *Sarsia: S. radiata, S. eximia, S. prolifer*, and *S. angulata*. But it is distinguishable from them by several features: namely the polyps of *S. radiata* and *S. eximia* are *Syncoryne*-type with no reduced filiform tentacles, and medusa buds from the medusae are found in *S. prolifer*. As pointed out by Russell (1953) there are several species of the genus *Sarsia* whose hydroid stage is not yet known, therefore it may be likely that some of them will be transferred to the genus *Stauridiosarsia* in future. Moreover reduced filiform tentacles of the hydroid of Corynidae are somewhat unstable as pointed out by Rees (1936), Russell (1953), and Hirai (1960).

The presence of microbasic mastigophores in the present medusa is interesting in contrast with some species of the genus *Sarsia* provided with stenoteles and desmonemes only as reported by Russell (1938).

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